# FIXING DEVICE

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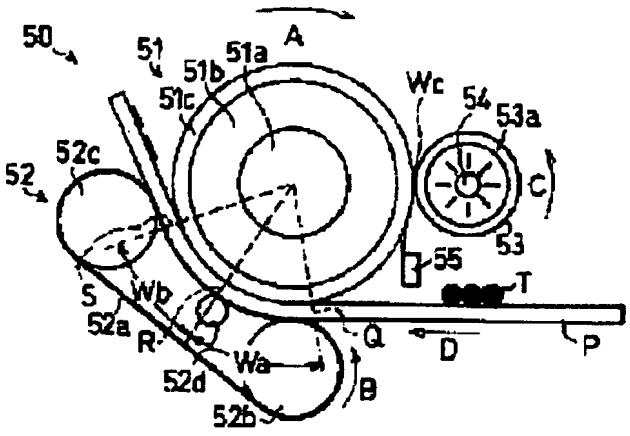
Abstract of **JP10254266**

PROBLEM TO BE SOLVED: To provide a fixing device capable fixing color toner without applying oil, and hardly causing offset. SOLUTION: Toner T is thermally melted and fixed by carrying paper P, to which toner T adheres, to a fixing nip part formed by a fixing roller 51, whose surface is heated from the outside and a pressure belt 52a stretched and laid on 1st and 2nd pressure rollers 52b and 52c and pressing the outer peripheral surface of the roller 51. A fixing nip entrance area Wa set to a temperature equal to or above the softening point of the toner T and a fixing nip exit area Wb set to a temperature necessary to cool and solidify the melted toner T are formed in order from an upstream side in the carrying direction of the paper P in the fixing nip part.



* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

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## CLAIMS

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[Claim(s)]
[Claim 1] It is laid with the fixing roller with which the front face was heated from the exterior, and this fixing roller and two or more pressurization rollers arranged at parallel. Including the pressurization belt which presses the peripheral face of this fixing roller in the pressure-welding section formed by the above-mentioned fixing roller and the pressurization belt In the anchorage device which thermofusion of the toner is carried out [ anchorage device ] to this record material, and fixes it to it by conveying the record material in which the non-established toner image was formed in the above-mentioned pressure-welding section The anchorage device characterized by forming in order the accumulation field set as the temperature more than the softening temperature of a toner, and the heat dissipation field set as the temperature which carries out cooling solidification of the toner by which melting was carried out from the conveyance direction upstream of record material.
[Claim 2] The above-mentioned pressurization belt is an anchorage device according to claim 1 with which at least one pressurization roller is characterized by carrying out contact arrangement at the fixing roller through the above-mentioned pressurization belt among two or more above-mentioned pressurization rollers in the above-mentioned accumulation field while being formed for the material which has thermal conductivity.
[Claim 3] The pressurization roller by which contact arrangement is carried out through the pressurization belt at the above-mentioned fixing roller is an anchorage device according to claim 2 characterized by consisting of accumulation material.
[Claim 4] The pressurization roller which exists in the above-mentioned heat dissipation field is an anchorage device according to claim 2 or 3 characterized by consisting of a heat insulator.
[Claim 5] The anchorage device according to claim 3 or 4 characterized by being set up after accumulation of the pressurization roller with which the conveyance timing of the record material to the above-mentioned pressure-welding section consists of the above-mentioned accumulation material is carried out by the heat from the above-mentioned fixing roller.
[Claim 6] An anchorage device given in claim 1 thru/or any of 5 they are. [ which is characterized by forming the heating roller which heats the front face of the above-mentioned fixing roller from the outside in the record material conveyance direction upstream of the above-mentioned pressure-welding section ]
[Claim 7] The above-mentioned pressurization belt is an anchorage device given in claim 1 thru/or any of 6 they are. [ which is characterized by forming many air holes ]
[Claim 8] The above-mentioned pressurization belt is an anchorage device given in claim 1 thru/or any of 7 they are. [ which is characterized by consisting of a metal ]
[Claim 9] The above-mentioned fixing roller is an anchorage device given in claim 1 thru/or any of 8 they are. [ which is characterized by a core being cavernous structure ]
[Claim 10] An anchorage device given in claim 1 thru/or any of 9 they are. [ which is characterized by establishing a cooling means to cool near the record material outlet of the pressure-welding section with the above-mentioned fixing roller of the above-mentioned pressurization belt ]

[Claim 11] The above-mentioned cooling means is an anchorage device according to claim 10 characterized by being prepared in the field surrounded with the pressurization belt and the pressurization roller.
[Claim 12] The anchorage device according to claim 10 or 11 characterized by establishing a temperature detection means to detect the temperature of the pressurization belt near the record material outlet of the above-mentioned pressure-welding section, and the cooling control means which controls the refrigeration capacity of the above-mentioned cooling means based on the detection information on the above-mentioned temperature detection means.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the anchorage device especially used for the electrophotography device which can be printed full color about the anchorage device used for the electrophotography device using electrophotography processes, such as a copying machine, facsimile, and a printer.
[0002]
[Description of the Prior Art] The anchorage device currently conventionally used for the electrophotography device using electrophotography processes, such as a copying machine, facsimile, and a printer, has the fixing roller 101 and the pressurization roller 102 which carries out the pressure welding of this fixing roller 101, as shown in drawing 12 . The heater lamp 103 as a source of heating is arranged in the interior of the above-mentioned fixing roller 101, and the front face of a fixing roller 101 is heated from the interior.
[0003] By carrying in the form (record material) P which supported the image formed with the toner T which is not fixed to the pressure-welding part (fixing part) of the fixing roller 101 and the pressurization roller 102 with which the front face was heated by predetermined temperature, the anchorage device of the above-mentioned configuration carries out thermofusion of the toner T, and fixes Toner T to Form P. Thus, in order to heat the front face of a fixing roller 101, what established the source of heating of heater lamp 103 grade in the fixing roller 101 interior of this is called the anchorage device of an internal heating method.
[0004] Moreover, if the toner supported on Form P is a bad toner of the mold-release characteristic of a color toner etc., adhesion of the toner to fixing roller 101 front face and the so-called offset phenomenon will arise in the case of fixing. For this reason, the oil spreading device 105 for applying oil to fixing roller 101 front face and the exfoliation pawl 106 for exfoliating the form P after fixing from a fixing roller 101 are formed in the above-mentioned anchorage device. This oil spreading device 105 applies the oil 104 for offset prevention to fixing roller 101 front face through the roller 107-107 for spreading of a pair.
[0005] Moreover, there are some which do not need the oil for the above-mentioned offset as an anchorage device. For example, the anchorage device of the method (a film heating method is called hereafter) which heats the form which supported the non-established toner image through the thin endless film (endless belt) which moves synchronizing with a form, and is established in this toner is proposed as indicated by JP,63-313182,A, JP,4-358186,A, and JP,5-2349,A.
[0006] The anchorage device of this film heating method fixes to Form P the image formed with the non-established toner T by carrying in the form P which supported the image formed in the pressure-welding section of the endless film-like fixing belt 201 and the pressurization roller 203 which were stretched in the conveyance direction of record material with the non-established toner T, as shown in drawing 13 .
[0007] In the inside side by the side of the pressurization roller 203 of the above-mentioned fixing belt

201, a heating element 202 is arranged and the fixing section formed between the above-mentioned fixing belt 201 and the pressurization roller 203 is heated. Therefore, the form P which passes the above-mentioned fixing section is heated by the heat energy from a heating element 202, and thermofusion of the toner supported by Form P is carried out, and it is fixed to it.
[0008] The form [ finishing / toner fixing ] P is made to cool by the downstream of the fixing belt 201 (self-cooling is called hereafter), and this fixing belt 201 and Form P are made to separate in the above-mentioned anchorage device. Therefore, in the anchorage device of this film heating method, since self-cooling is carried out in the downstream of the fixing belt 201, it is lost that a toner adheres to the fixing belt 201. It becomes unnecessary thereby, to apply the oil for offset prevention.
[0009] That is, since according to the above-mentioned film heating method what has heat capacity small as a fixing belt 201 can be used, cooling by heat dissipation is made immediately after passing a heating unit, Toner T cools, cohesive force increases and adhesion force with the fixing belt 201 becomes weaker relatively, it is possible to prevent offset theoretically.
[0010]
[Problem(s) to be Solved by the Invention] However, a problem as shown below arises in the anchorage device of each above-mentioned conventional heating method.
[0011] (I) -- trouble [ of the anchorage device of an internal heating method ]: -- the source of heating is located inside, since heat transfer of a rubber layer is bad, warm-up time is long, further, the boundary of fixing roller core material 101a and rubber layer 101b rises, and the problem of becoming easy to carry out degradation exfoliation of the rubber layer 101b arises.
[0012] Moreover, fixing temperature is made high and heat energy is supplied to the color toner by which multilayer formation was carried out so much, and it is necessary to change a toner into a high melting condition and to make it color in the case of the anchorage device which used the full color electrophotography process especially. Thus, if a toner is made to exfoliate from a fixing roller 101 in the state of high melting, since the cohesive force inside a toner will decline rather than the adhesion force of a fixing roller 101 and a toner, a toner is divided inside and offset generates it.
[0013] Therefore, in order to make the adhesion force of a fixing roller 101 and a toner lower than internal cohesive force, as mentioned above, it is necessary to apply the oil 104 for offset prevention to the front face of a fixing roller 101.
[0014] However, in applying the oil 104 for offset prevention to fixing roller 101 front face, a problem as shown below arises.
[0015] ** A device complicated for applying to a fixing roller 101 is needed for homogeneity in oil 104, and invite the cost rise of equipment.
** Rubber layer 101b of a fixing roller 101 deteriorates and swells by oil 104, and the life of a fixing roller 101 becomes short.
** Oil 104 falls, and equipment becomes dirty or it has a bad influence on other devices.
** Adhere to Form P, and soil a user's hand or oil 104 gives displeasure.
** When OHP is used for Form P, and oil 104 adheres to an OHP front face, reduce the permeability of OHP.
** The periodical maintenance of reinforcement of oil 104 etc. is needed, and it is not user-friendly.
[0016] (II) The anchorage device of a film heating method: In the anchorage device of a film heating method, there is an advantage that it is not necessary to apply oil for offset prevention. Since the heat capacity of the film used as a fixing means is otherwise small compared with a fixing roller, there is also an advantage that warm-up time can be shortened.
[0017] However, since devices, such as control of the tension added to this fixing belt 201 since the fixing belt 201 is an endless belt-like as shown in drawing 13 , meandering prevention of the fixing belt 201, and wrinkling prevention by the thermal expansion of the fixing belt 201, are needed, the drive of the fixing belt 201 will become very complicated, and the problem of inviting the cost rise of equipment will arise.
[0018] Moreover, since the fixing belt 201 makes thickness thin in order to make heat capacity small, compared with a roller-like fixing roller, its life is short. Since especially the fixing belt 201 comes to

slide on a heating element 202, it wears out and the life becomes short. And in order to raise a print speed, when the rotational speed of the fixing belt 201 is sped up, the life of the fixing belt 201 becomes still shorter. For this reason, the problem of the ability not to make the quick electrophotography device of a print speed corresponding arises.

[0019] By thickening thickness of the above-mentioned fixing belt 201, each above-mentioned trouble is solvable to some extent. However, the heat capacity of the fixing belt 201 becomes large by thickening thickness of the fixing belt 201. By this, warm-up time becomes long and the advantage of shortening the warm-up time of the anchorage device of a film heating method fades.

[0020] Moreover, if the heat capacity of the fixing belt 201 becomes large, the toner on the form after fixing cannot fully be cooled until it will be in a solid state, but there is a possibility that an offset phenomenon may arise. For this reason, in order to fully cool until it will be in a solid state about the toner on the form after fixing, in order to prevent an offset phenomenon, forced-cooling means, such as a ventilation means, are needed for the migration direction downstream of the fixing belt 201. In this case, thermal efficiency worsens and the problem of equipment being complicated and enlarging arises.

[0021] Without having been made in order that this invention might solve each above-mentioned trouble, and the purpose's having short warm-up time, excelling in thermal efficiency and temperature homogeneity, and applying oil, fixing of a color toner is possible, and it can respond also to a high-speed print, and excels in endurance and safety, and a configuration is easy and is to offer the cheap anchorage device of a manufacturing cost.

[0022]

[Means for Solving the Problem] The fixing roller with which the front face was heated from the exterior in order that the anchorage device of claim 1 might solve the above-mentioned technical problem, It is laid with this fixing roller and two or more pressurization rollers arranged at parallel. Including the pressurization belt which presses the peripheral face of this fixing roller in the pressure-welding section formed by the above-mentioned fixing roller and the pressurization belt In the anchorage device which thermofusion of the toner is carried out [ anchorage device ] to this record material, and fixes it to it by conveying the record material in which the non-established toner image was formed in the above-mentioned pressure-welding section It is characterized by forming in order the accumulation field set as the temperature more than the softening temperature of a toner, and the heat dissipation field set as temperature required in order to carry out cooling solidification of the toner by which melting was carried out from the conveyance direction upstream of record material.

[0023] According to the above-mentioned configuration, in the pressure-welding section formed by the fixing roller and the pressurization belt, cooling solidification of the toner by which changed into sufficient elevated-temperature melting condition for the toner on record material to color in an accumulation field first, then melting was carried out in the heat dissipation field is carried out. Since a toner is cooled until cooling solidification is carried out, the cohesive force at this time becomes larger than the adhesion force of a toner and a fixing roller, and it is completely fixed [ in / at this time / the heat dissipation field of the above-mentioned pressure-welding section ] to it on record material.

[0024] Thereby, since it is not necessary to apply the oil for offset prevention to a fixing roller for the offset prevention after fixing, the various problems resulting from the oil for offset prevention are solvable. Since the device which applies the oil for offset prevention especially is not needed, equipment can be simplified and image formation equipments, such as a printer equipped with this anchorage device, can be offered cheaply.

[0025] In order that the anchorage device of claim 2 may solve the above-mentioned technical problem, while being formed for the material for which a pressurization belt has thermal conductivity in addition to the configuration of claim 1, at least one pressurization roller is characterized by carrying out contact arrangement at the fixing roller through the above-mentioned pressurization belt among two or more pressurization rollers in the above-mentioned accumulation field.

[0026] According to the above-mentioned configuration, since the pressurization belt is formed for the material which has thermal conductivity, the heat energy from a fixing roller propagation-comes to be easy of the belt. And the pressurization roller with which contact arrangement of the heat energy from a

fixing roller was carried out with the above-mentioned fixing roller through the pressurization belt in the accumulation field of the pressurization section by contact arrangement of at least one pressurization roller being carried out through the above-mentioned pressurization belt among two or more pressurization rollers in the above-mentioned accumulation field comes to be supplied.
[0027] Since the pressurization roller which touches the fixing roller through a pressurization belt is covered with heat energy by this, as for the toner on the record material conveyed in the accumulation field, the heat energy from a fixing roller and the heat energy from the above-mentioned pressurization roller come to flow in. For this reason, an accumulation field will be in an elevated-temperature melting condition, and can supply heat energy efficiently to the toner on record material.
[0028] In order that the anchorage device of claim 3 may solve the above-mentioned technical problem, in addition to the configuration of claim 2, the pressurization roller by which contact arrangement is carried out through the pressurization belt at the fixing roller is characterized by consisting of accumulation material.
[0029] Since the heat energy which flows into the pressurization roller by which contact arrangement is carried out through the pressurization belt from a fixing roller becomes is easy to be accumulated in a fixing roller in addition to an operation of claim 2 according to the above-mentioned configuration, in the accumulation field of the fixing section, little heat energy can maintain at an elevated-temperature condition. Since there is little energy required in order to heat a fixing roller and it ends by this, an economical anchorage device can be offered.
[0030] In order that the anchorage device of claim 4 may solve the above-mentioned technical problem, in addition to the configuration according to claim 2 or 3, the pressurization roller which exists in a heat dissipation field is characterized by consisting of a heat insulator.
[0031] Since the heat energy which flows in from a pressurization belt in a heat dissipation field is not accumulated in a pressurization roller according to the above-mentioned configuration, cooling solidification of the melting toner on record material can be carried out effectively.
[0032] The anchorage device of claim 5 is characterized by being set up after accumulation of the pressurization roller with which the conveyance timing of the record material to the pressure-welding section consists of the above-mentioned accumulation material is carried out by the heat from the above-mentioned fixing roller in addition to a configuration according to claim 3 or 4, in order to solve the above-mentioned technical problem.
[0033] Since according to the above-mentioned configuration it can consider as the condition of fully having been heated before record material is conveyed by the pressure-welding section, melting of the non-established toner on record material can be certainly carried out from a pressure-welding section inlet-port field. Thereby, when a toner is a color, poor coloring by the lack of temperature can be lost, and a high-definition color picture can be offered.
[0034] The anchorage device of claim 6 is characterized by forming the heating roller which heats the front face of a fixing roller from the outside to the record material conveyance direction upstream of the pressure-welding section in addition to claim 1 thru/or which configuration of 5, in order to solve the above-mentioned technical problem.
[0035] According to the above-mentioned configuration, since a fixing roller comes to be heated by the heating roller formed in the record material conveyance direction upstream of the pressure-welding section, it comes to be heated from the record material entrance side of the pressure-welding section. This becomes possible [ making as small as possible loss of the heat energy supplied to a fixing roller ] from the heating roller of a before [ from a heating roller / the pressure-welding section ]. Therefore, since a fixing roller can be heated to temperature required for toner melting with little energy, the energy concerning an anchorage device is reducible.
[0036] In order that the anchorage device of claim 7 may solve the above-mentioned technical problem, in addition to claim 1 thru/or which configuration of 6, the pressurization belt is characterized by forming many air holes.
[0037] According to the above-mentioned configuration, by forming many air holes, the elevated-temperature air which stagnates to the heat dissipation field of the pressure-welding section is positively

emitted to the belt exterior, a convective heat transfer coefficient can be enlarged, a pressurization belt can be made to be able to carry out improvement stabilization of the heat dissipation engine performance of a pressurization belt, and the cooling effect of a toner can be raised to it. Thereby, since the heat dissipation effectiveness in the heat dissipation field of the pressure-welding section can be heightened, cooling solidification of the toner by which melting was carried out in the accumulation field can be certainly carried out in this heat dissipation field. Consequently, since a toner can be completely fixed to record material, offset can be abolished certainly.

[0038] In addition to claim 1 thru/or which configuration of 7, the anchorage device of claim 8 is characterized by a pressurization belt consisting of a metal, in order to solve the above-mentioned technical problem.

[0039] According to the above-mentioned configuration, it excels in thermal conductivity and can be made a belt with small heat capacity and the high heat dissipation cooling effect because a pressurization belt consists of a metal. Thereby, it can be efficient and the heat energy from the fixing roller in an accumulation field can be transmitted to the pressurization roller by which contact arrangement is carried out through the pressurization belt at this fixing roller. Moreover, the heat energy from the fixing roller in a heat dissipation field can be efficiently emitted to the pressurization belt exterior. Therefore, in the pressure-welding section between a fixing roller and a pressurization belt, since the temperature change stabilized in the toner can be given, fixing which does not have offset and was stabilized can be performed.

[0040] In order that the anchorage device of claim 9 may solve the above-mentioned technical problem, in addition to claim 1 thru/or which configuration of 8, the fixing roller is characterized by a core being cavernous structure.

[0041] According to the above-mentioned configuration, by making the core of a fixing roller into a cavity, since the heat energy from a fixing roller front face is not accumulated in the interior, the effect of the heat dissipation field on the pressure-welding section by the accumulation inside a fixing roller can be lost. Thereby, the cooling effect of the toner in the heat dissipation field of the pressure-welding section can be heightened.

[0042] The anchorage device of claim 10 is characterized by establishing a cooling means to cool near the record material outlet of the pressure-welding section with the fixing roller of a pressurization belt in addition to claim 1 thru/or which configuration of 9, in order to solve the above-mentioned technical problem.

[0043] According to the above-mentioned configuration, a pressurization belt can be compulsorily cooled by a cooling means to cool near the record material outlet of the pressure-welding section of a pressurization belt being established. By this, the convective heat transfer coefficient of a pressurization belt can be enlarged, improvement stabilization of the heat dissipation engine performance of a pressurization belt can be carried out, and the cooling effect of the toner in a heat dissipation field can be heightened.

[0044] In order that the anchorage device of claim 11 may solve the above-mentioned technical problem, in addition to the configuration of claim 10, the cooling means is characterized by being prepared in the field surrounded with the pressurization belt and the pressurization roller.

[0045] Since the elevated-temperature air which stagnates to the field surrounded with the pressurization belt and the pressurization roller by the cooling means can be made to discharge compulsorily in addition to an operation of claim 10 according to the above-mentioned configuration, the cooling effect of a pressurization belt can be heightened further.

[0046] In addition to the configuration of claims 10 or 11, the anchorage device of claim 12 is characterized by establishing a temperature detection means to detect the temperature of the pressurization belt near the record material outlet of the pressure-welding section, and the cooling control means which controls the refrigeration capacity of a cooling means based on the detection information on the above-mentioned temperature detection means, in order to solve the above-mentioned technical problem.

[0047] According to the above-mentioned configuration, since the pressurization belt is controlled based

on the temperature of the latest pressurization belt which secedes from a fixing roller, the refrigeration capacity of a cooling means can keep constant the temperature in the heat dissipation field of the pressure-welding section. Thereby, the cooling effect of the toner in the above-mentioned heat dissipation field can be stabilized.

[0048]

[Embodiment of the Invention]

[Gestalt 1 of operation] It will be as follows if one gestalt of operation of this invention is explained based on drawing 1 thru/or drawing 5 , and drawing 8 . In addition, the gestalt of this operation explains the case where it applies to the laser beam printer for monochrome by using an anchorage device as an electrophotography device.

[0049] The laser beam printer concerning the gestalt of this operation has the feed section 10, image formation equipment 20, the laser scan section 30, and an anchorage device 50, as shown in drawing 2 .

[0050] The laser beam printer of the above-mentioned configuration conveys Form P from the feed section 10 to image formation equipment 20. This image formation equipment 20 forms a toner image based on the laser beam 34 by the laser scan section 30, and imprints this toner image in the conveyed form P as record material. And the form P with which the toner image was imprinted is conveyed to an anchorage device 50, and a toner image is fixed to Form P. Finally, the form P with which it was fixed to the toner image is discharged by the equipment exterior with the form delivery roller 41-42 formed in the form conveyance downstream of an anchorage device 50. That is, in accordance with the path of the arrow head E shown in drawing, Form P is conveyed in order of a medium tray 11, image formation equipment 20, and an anchorage device 50, and is discharged by the equipment exterior.

[0051] The above-mentioned feed section 10 is equipped with a medium tray 11, the feed roller 12, the deleaving file plate 13, the pressurization spring 14, the form detection actuator 15, the form detection sensor 16, and the control circuit 17.

[0052] The above-mentioned medium tray 11 can equip with two or more forms P. The feed roller 12 feeds the image formation equipment 20 side with the form P with which the above-mentioned medium tray 11 was equipped by rotating in the direction of an arrow head. At this time, the pressure welding of the deleaving file plate 13 is carried out to the feed roller 12 with the pressurization spring 14, and it separates at a time one sheet of two or more forms P with which the medium tray 11 was equipped.

[0053] While the above-mentioned form detection sensor 16 consists of a photosensor, the above-mentioned form detection actuator 15 consists of a member which can be freely concentrated in the form conveyance direction with the form P with which it is fed with the feed roller 12. That is, in the condition that the form detection actuator 15 is not concentrated, an optical path is intercepted and the form detection sensor 16 shows an OFF condition, and after the form detection actuator 15 has concentrated, an optical path leads and it shows ON condition in it.

[0054] Therefore, a sensor will be in ON condition, and the form detection sensor 16 detects that the image formation equipment 20 side was fed with Form P, and outputs this detection signal to a control circuit 17 because the form detection actuator 15 concentrates.

[0055] The above-mentioned control circuit 17 controls delivery, and lighting / astigmatism LGT of luminescence die ODODO 31a for a picture signal to the laser diode luminescence unit 31 of the laser scan section 30 based on the detection signal from the form detection sensor 16. In addition, the control circuit 17 serves as the heating control means of the anchorage device 50 mentioned later.

[0056] The above-mentioned laser scan section 30 is equipped with the above-mentioned laser diode luminescence unit 31, the scan mirror 32, the scan mirror motor 33, and the reflective mirrors 35, 36, and 37.

[0057] The above-mentioned scan mirror motor 33 is formed in the lower part of the scan mirror 32, and makes a high speed and constant speed rotate this scan mirror 32. Moreover, the above-mentioned laser diode luminescence unit 31 is formed in the scan mirror 32, and rotates with this scan mirror 32. That is, the laser diode luminescence unit 31 irradiates a laser beam 34 from luminescence die ODODO31a at the reflective mirror 36, rotating to a high speed and constant speed. It is reflected in order of the reflective mirrors 36, 35, and 37, and the irradiated laser beam 34 is led to the exposure point X of

image formation equipment 20.
[0058] The above-mentioned laser diode luminescence unit 31 exposes alternatively the photo conductor 21 of image formation equipment 20 based on the information on lighting / astigmatism LGT from the control circuit 17 mentioned above.
[0059] The above-mentioned image formation equipment 20 is equipped with a photo conductor 21, the imprint roller 22, the electrification member 23, the developing roller 24, the development unit 25, and the cleaning unit 26.
[0060] The charge to which the photo conductor 21 was beforehand charged on the front face by the electrification member 23 discharges alternatively by the laser beam 34 from the laser scan section 30, and an electrostatic latent image is formed in a front face.
[0061] The development unit 25 has the developing roller 24 for supplying a toner to a photo conductor 21, is agitating the toner accumulated in the interior, gives a charge to this toner, and makes a toner adhere to the developing-roller 24 above-mentioned front face. And the toner image according to the electrostatic latent image formed in photo conductor 21 front face is formed on a photo conductor 21 according to an operation of the electric field formed of the potential of the development bias voltage given to the developing roller 24 and photo conductor 21 front face.
[0062] Moreover, with image formation equipment 20, the imprint roller 22 attracts and imprints the toner image formed in photo conductor 21 front face of the operation of the electric field which the impressed imprint electrical potential difference gives in the form P fed between the photo conductor 21 and the imprint roller 22. Non-imprinted toners are collected by the cleaning unit 26 while the toner on a photo conductor 21 is imprinted by Form P with the imprint roller 22 at this time.
[0063] The form P by which the toner image was imprinted with image formation equipment 20 is conveyed by the anchorage device 50, and it is fixed to a toner image. That is, moderate temperature and a moderate pressure are given to Form P in an anchorage device 50 by the fixing roller 51 with which skin temperature was kept at 180 degrees C, and the pressurization device 52 as a pressurization means by which accumulation was carried out to about 140 degrees C. And thermofusion is carried out, it is fixed to Form P, and a toner serves as a strong image. In addition, the above-mentioned anchorage device 50 is stated to a detail later.
[0064] The form P fixed to the toner image with the anchorage device 50 is conveyed to the equipment exterior with the form conveyance roller 41-42 formed in the form side of this anchorage device 50.
[0065] In addition, the above-mentioned anchorage device 50 is a heat tracing method which heats a fixing roller 51 to the above-mentioned fixing roller 51 with the heating roller 53 by which contact arrangement was carried out.
[0066] Here, an anchorage device 50 is explained below, referring to drawing 1 . The above-mentioned anchorage device 50 has the heating roller 53 as a fixing roller 51, the pressurization device 52, and a heating means, as shown in drawing 1 .
[0067] First, the pressurization device 52 is explained. 1st pressurization roller 52b by which the above-mentioned pressurization device 52 was established directly under the above-mentioned fixing roller 51, 2nd pressurization roller 52c arranged rather than the above-mentioned 1st pressurization roller 52b along with a fixing roller 51 at the conveyance direction downstream of Form P, It consists of pressurization belt 52a laid by 3rd pressurization roller 52d arranged between the above-mentioned 1st pressurization roller 52b and 2nd pressurization roller 52c, and these roller 52b and 52 c.52d by predetermined tension.
[0068] The above 1st - the 3rd pressurization rollers 51b-51d are arranged in parallel with a fixing roller 51.
[0069] With the above-mentioned 1st - the above-mentioned 3rd pressurization rollers 51b-51d, the pressure welding of the above-mentioned pressurization belt 52a is carried out to a fixing roller 51, and it forms the pressure-welding section (fixing nip section). This fixing nip section is a thing in order to fix the toner T on Form P.
[0070] The fixing nip inlet-port field Wa which is an inlet-port field of the fixing nip section is formed in the above-mentioned fixing nip section by the pressure welding of the pressurization belt 52a being

carried out to a fixing roller 51 of above-mentioned 1st pressurization roller 52b and 3rd pressurization roller 52d. This fixing nip inlet-port field Wa is a pressure-welding field of the fixing roller 51 shown between the points (the pressure-welding start point Q of a fixing roller 51 and 1st pressurization roller 52b, a fixing roller 51, and 3rd pressurization roller 52d) R ending [ pressure-welding ], and pressurization belt 52a.

[0071] Moreover, the above-mentioned fixing nip section carries out the pressure welding of the pressurization belt 52a to a fixing roller 51 by the above-mentioned 2nd pressurization roller 52c and 3rd pressurization roller 52d, and the fixing nip outlet field Wb which is an outlet field of the fixing nip section is formed. This fixing nip outlet field Wb is a pressure-welding field of the fixing roller 51 shown between the points S of the point (a fixing roller 51 and 3rd pressurization roller 52d) R ending [ pressure-welding ], a fixing roller 51, and pressurization belt 52a ending [ pressure-welding ], and pressurization belt 52a.

[0072] The above-mentioned fixing nip inlet-port field Wa is an accumulation field which accumulates the heat energy from a fixing roller 51, in order to fuse the toner T on Form P. On the other hand, the fixing nip outlet field Wb is a heat dissipation field which emits the heat energy given in the fixing nip inlet-port field Wa, in order to carry out cooling solidification of the toner T with which melting of [ on Form P ] was carried out.

[0073] So, the fixing nip section formed by the above-mentioned fixing roller 51 and the pressurization device 52 has structure with the accumulation field for fusing the toner T on Form P, and the heat dissipation field for carrying out cooling solidification of the toner T by which melting was carried out. In addition, about a temperature setup in each field of the above-mentioned fixing nip section, it mentions later.

[0074] By the pressurization device 52 of the above-mentioned configuration, if a fixing roller 51 rotates in the direction of arrow-head A, it will follow to this and pressurization belt 52a which constitutes the pressurization device 52 and the 1st - the 3rd roller 52b-52d will rotate in the direction of arrow-head B.

[0075] While being arranged at this time so that a fixing roller 51 may be contacted through pressurization belt 52a above-mentioned 1st pressurization roller 52b and 3rd pressurization roller 52d, the above-mentioned 2nd pressurization roller 52c is arranged so that it may not contact in a fixing roller 51, although pressurization belt 52a is made to press to a fixing roller 51 side.

[0076] Thereby, the heat energy from a fixing roller 51 flows into above-mentioned 2nd pressurization roller 52c to the heat energy from a fixing roller 51 flowing into above-mentioned 1st pressurization roller 52b and 3rd pressurization roller 52d. About the heat energy from this fixing roller 51 flowing, it mentions later.

[0077] With the gestalt of this operation, the tension to pressurization belt 52a with the above 1st - the 3rd pressurization rollers 52b-52d is adjusted so that width of face of about 10mm and the fixing nip outlet field Wb may be set to about 15mm for the width of face of the above-mentioned fixing nip inlet-port field Wa.

[0078] The above-mentioned pressurization belt 52a is excellent in the thermal conductivity of aluminum with a perimeter [ of 60mm ], and a thickness of 0.05mm, nickel, etc., and heat capacity is formed using the small high metallic material of the heat dissipation cooling effect. this pressurization belt 52a -- the contact surface with a fixing roller 51 -- a metal side -- although it is good even if it remains as it is, that front face may be coated with what mixed a fluororesin, a fluororesin, and fluororubbers, such as polymeric materials, such as a synthetic-resin ingredient excellent in thermal resistance and a mold-release characteristic, for example, silicone rubber, and a fluororubber, or PFA (tetrafluoroethylene = par follow alkyl vinyl ether copolymerization resin), PTFE (tetrafluoroethylene resin).

[0079] By thus, the thing which the above-mentioned pressurization belt 52a is excellent in thermal conductivity, and heat capacity consists of a small high metallic material of the heat dissipation cooling effect Are efficient in the heat energy from the fixing roller 51 in the fixing nip inlet-port field Wa which is an accumulation field. the 1st by which contact arrangement is carried out through pressurization belt 52a at this fixing roller 51, and the 3rd, while it can transmit to pressurization roller

52 b.52d The heat energy from the fixing roller 51 of the fixing nip outlet field Wb which is a heat dissipation field can be efficiently emitted to the pressurization belt 52a exterior.
[0080] Therefore, in the fixing nip section between a fixing roller 51 and pressurization belt 52a, since the temperature change stabilized in the toner can be given, fixing which does not have offset and was stabilized can be performed.
[0081] Moreover, the high metal solid roller of the accumulation effectiveness, such as aluminum of diameter 20 mm.10mm and stainless steel, is used above-mentioned 1st pressurization roller 52b and 3rd pressurization roller 52d.
[0082] Since the heat energy which flows into the 1st and 3rd pressurization rollers 52b and 52d by which contact arrangement is carried out through pressurization belt 52a from a fixing roller 51 becomes is easy to be accumulated in a fixing roller 51 because 1st pressurization roller 52b and 3rd pressurization roller 52d consist of a metallic material which is accumulation material by this, in the fixing nip inlet-port field Wa, little heat energy can maintain at an elevated-temperature condition. Since there is little energy required in order to heat a fixing roller 51 and it ends by this, an economical anchorage device can be offered.
[0083] Moreover, the elastic roller which consists of resin which has the elasticity of the rubber to which 2nd pressurization roller 52c which is a tension roller has adiathermic [ with a diameter of 20mm ] is used. Thus, since 2nd pressurization roller 52c which exists in the fixing nip outlet field Wb which is a heat dissipation field consists of a heat insulator, the heat energy which flows in from pressurization belt 52a in the fixing nip outlet field Wb is not accumulated in 2nd pressurization roller 52c. Thereby, in the fixing nip outlet field Wb, cooling solidification of the toner T by which melting was carried out on Form P can be carried out effectively.
[0084] Next, a heating roller 53 is explained. The above-mentioned heating roller 53 has the heater lamp 54 as a source of heating inside, and is formed in the upstream of the fixing nip section to the hand of cut of a fixing roller 51. At this time, a heating roller 53 is arranged in the location where that core becomes almost level at the core of a fixing roller 51, and carries out a pressure welding to this fixing roller 51 with predetermined thrust.
[0085] In drawing 1 , the heating roller 53 shows the condition of having contacted the fixing roller 51, and makes the pressure-welding section formed between the fixing roller 51 and the heating roller 53 the heating nip section Wc. With the gestalt of this operation, the width of face of the heating nip section Wc is 5mm. Moreover, the above-mentioned heating roller 53 is carrying out a pressure welding to a fixing roller 51, follows to rotation of a fixing roller 51 like pressurization belt 52a, and rotates in the direction of arrow-head C.
[0086] The bell shape thing which consists of aluminum, stainless steel, etc. is used for a heating roller 53. Although aluminum and stainless steel may be used as it is, the front face may be coated with what mixed a fluororesin, a fluororesin, and fluororubbers, such as polymeric materials, such as a synthetic-resin ingredient excellent in thermal resistance and a mold-release characteristic, for example, silicone rubber, and a fluororubber, or PFA, PTFE.
[0087] In addition, with the gestalt of this operation, the cylinderical roller made from aluminum with a diameter [ of 15mm ] and a thickness of 0.5mm is used. Moreover, rated output of the heater lamp 54 arranged inside a heating roller 53 is set to 400W.
[0088] The thermistor (not shown) as a temperature detection means is arranged by the peripheral surface of the above-mentioned heating roller 53, and the skin temperature of a heating roller 53 is detected to it. Moreover, near the downstream of the heating nip section Wc, the thermistor 55 as a temperature detection means for detecting the skin temperature of a fixing roller 51 is arranged to the hand of cut of the above-mentioned fixing roller 51.
[0089] Moreover, the above-mentioned heating roller 53 is formed in the record material conveyance direction upstream of the fixing nip section. Thereby, since a fixing roller 51 comes to be heated by the heating roller 53 formed in the record material conveyance direction upstream of the fixing nip section, it comes to be heated from the record material entrance side of the fixing nip section. Therefore, it becomes possible from the heating roller 53 of a before [ from a heating roller 53 / the fixing nip

section ] to make as small as possible loss of the heat energy supplied to a fixing roller 51. Consequently, since a fixing roller 51 can be heated to temperature required for toner melting with little energy, the energy concerning an anchorage device is reducible.

[0090] Subsequently, a fixing roller 51 is explained. The above-mentioned fixing roller 51 is the thing of the shape of a roller with a diameter of 30mm, and as shown in drawing 1 , thermal break 51b which consists of heat-resistant elastic material is formed on core material 51a, and it has composition with which enveloping layer 51c which consists of a heat-resistant release agent on this thermal break 51b was covered.

[0091] that from which core material 51a obtains the reinforcement of a fixing roller 51 -- it is -- aluminum, stainless steel, etc. -- a solid -- cylindrical or the thing processed into the bell shape is used. In addition, with the gestalt of this operation, the solid cylinder shaft made from stainless steel with a diameter [ of 15mm ] and a thickness of 2mm is used as core material 51a. The gestalt 2 of next operation explains explanation of bell shape core material 51a.

[0092] Thermal break 51b is prepared for the purpose which does not miss the heat of enveloping layer 51c heated by the heating roller 53 to the fixing roller 51 interior, and the purpose which carries out elastic deformation moderately through pressurization belt 52a by 1st pressurization roller 52b and 2nd pressurization roller 52c, and obtains predetermined nip width of face.

[0093] As heat-resistant elastic material which constitutes thermal break 51b, there is rubber material excellent in thermal resistance, such as a fluororubber and silicone rubber. With the gestalt of this operation, silicone rubber foam is cast and used for 7.5mm in thickness as thermal break 51b. This silicone rubber foam is suitable for thermal conductivity to be low excellent in adiathermic, and obtain nip width of face predetermined with the low voltage force also with a low degree of hardness.

[0094] Enveloping layer 51c is giving the heat to the toner T on Form P for heat in reception and the fixing nip section from the heating roller 53 by the heating nip section Wc, and is prepared for the purpose established in Toner T, and the purpose which prevents contamination by adhesion of the toner to fixing roller 51 front face etc.

[0095] Fluororesins, such as PFA and PTFE, are used as a heat-resistant release agent which constitutes enveloping layer 51c. With the gestalt of this operation, the PFA tube with a thickness of 50 micrometers is used as enveloping layer 51c.

[0096] Here, it explains below that the heat energy in the fixing nip section formed by the above-mentioned fixing roller 51 and the pressurization device 52 flows.

[0097] It explains below that the heat energy in the above-mentioned fixing nip section flows, referring to drawing 3 .

[0098] First, it explains that the heat energy of the fixing nip inlet-port field Wa of an anchorage device 50 flows. the time of fixing initiation -- a fixing roller 51 and the 1st, and the 3rd -- accumulation of the pressurization roller 52 b.52d is carried out to predetermined temperature, and the fixing nip inlet-port field Wa is held in the elevated-temperature condition more than the softening temperature of a toner.

[0099] And the heat energy with which the toner T on the form P conveyed to the fixing nip inlet-port field Wa was accumulated in thermal break 51b of a fixing roller 51, and the heat energy accumulated in 1st pressurization roller 52b are given. In this fixing nip inlet-port field Wa, sufficient heat energy to fuse the toner T on Form P is given. In addition, the above-mentioned 1st pressurization roller 52b is in the condition that accumulation was fully carried out, while Form P is conveyed to the fixing nip inlet-port field Wa, since it is in contact with the fixing roller 51 through the above-mentioned pressurization belt 52a.

[0100] And in the fixing nip inlet-port field Wa, 3rd pressurization roller 52d arranged between 1st pressurization roller 52b and 2nd pressurization roller 52c consists of metal rollers, and it is in contact through a fixing roller 51 and pressurization belt 51a. Thereby, the above-mentioned 3rd pressurization roller 52d, accumulation is carried out by the heat from a fixing roller 51, and heat energy is given to the toner T on Form P in the fixing nip inlet-port field Wa.

[0101] Next, it explains that the heat energy of the fixing nip outlet field Wb of an anchorage device 50 flows. The heat accumulated in the above-mentioned fixing nip inlet-port field Wa is emitted through

metal pressurization belt 52a, and the toner T on the form P conveyed to the fixing nip outlet field Wb is cooled. Thereby, it is solidified in the fixing nip inlet-port field Wb, and is fixed to Toner T on Form P.
[0102] The fixing nip inlet-port field Wa of the fixing nip section and the fixing nip outlet field Wb in the above-mentioned anchorage device 50 are set up so that the temperature of a toner may serve as temperature distribution shown in the graph shown in drawing 4 in the fixing nip department.
[0103] namely, the fixing nip inlet-port field Wa -- the temperature of a toner -- softening temperature TN of a room temperature to a toner exceeding -- a boundary line with the fixing nip outlet field Wb -- temperature TO of a peak up to -- it is the accumulation field set up so that it might go up. on the other hand -- the fixing nip outlet field Wb -- the temperature of a toner -- temperature TO of the above-mentioned peak from -- toner softening temperature TN exceeding -- further -- the offset generating critical temperature TG It is the heat dissipation field set up so that it might cool until it exceeds.
[0104] The toner by which melting was carried out carries out cooling solidification, and the above-mentioned offset generating critical temperature is temperature as for which the cohesive force becomes larger than the adhesion force of a toner and a fixing roller.
[0105] However, since it changes with classes of toner, it is necessary to set up the above-mentioned softening temperature and the above-mentioned offset generating critical temperature of a toner according to a toner.
[0106] In addition, with the gestalt of this operation, as the temperature distribution of the toner T on the form P which passes fixing nip circles show drawing 4 by controlling the skin temperature of a fixing roller 51, and changing the width of face of the fixing nip section, the fixing nip inlet-port field Wa which is an accumulation field, and the fixing nip outlet field Wb which is a heat dissipation field are formed.
[0107] It ****** below, referring to drawing 1 about actuation of the anchorage device 50 of the above-mentioned configuration here. In the above-mentioned anchorage device 50, at the time of print actuation, a fixing roller 51 rotates by peripheral-speed 150 mm/sec in the direction of arrow-head A, and a heating roller 53 is heated with the heater lamp 54.
[0108] At this time, a front face is heated in the heating nip section Wc with the heating roller 53 with which the fixing roller 51 was heated, and that skin temperature is detected with a thermistor 55. And the skin temperature of a fixing roller 51 is detected by the thermistor 55, and, as for a heating roller 53, the energization to the above-mentioned heater lamp 54 is controlled by the energization control circuit (not shown) based on this detecting signal.
[0109] That is, the skin temperature of the above-mentioned fixing roller 51 is controlled to become predetermined temperature (the gestalt of this operation 180 degrees C) based on the detection signal by the above-mentioned thermistor 55.
[0110] At this time, the heat energy from a fixing roller 51 is flowing into 1st pressurization roller 52b through pressurization belt 52a. And Form P is conveyed by the fixing nip section after 1st pressurization roller 52b reaches predetermined temperature (i.e., after the heat of the specified quantity is accumulated).
[0111] That is, the form P which supported the image formed in the fixing nip inlet-port field Wa between a fixing roller 51 and the pressurization device 52 with the non-established toner T from image formation equipment 20 is conveyed from arrow-head D to the fixing nip outlet field Wb, after accumulation of the 1st pressurization roller b is carried out.
[0112] the form P conveyed to the fixing nip inlet-port field Wa of the above-mentioned fixing nip section -- a fixing roller 51, the 1st, and the 3rd -- the pressure of the heat energy from pressurization roller 52 b.52d and the fixing nip section is given. Thereby, thermofusion of the toner T which is carrying out electrostatic adhesion is carried out on Form P. And while a pressure is given, cooling solidification is carried out, and heat-and-pressure fixing of the toner T with which thermofusion of [ on the form P conveyed to the fixing nip outlet field Wb of the fixing nip section ] was carried out is completely carried out on Form P.
[0113] After fixing, Form P exfoliates from a fixing roller 51 along the front face of the pressurization roller 52, and exfoliates from the pressurization roller 52 after that.

[0114] As mentioned above, if it is set up after accumulation of the 1st pressurization roller 52b which the conveyance timing of the form P to the fixing nip section becomes from the above-mentioned accumulation material is carried out by the heat from the above-mentioned fixing roller 51, before Form P is conveyed by the fixing nip section, it can consider as the condition of fully having been heated.
[0115] Thereby, since melting of the non-established toner on Form P can be certainly carried out from the fixing nip inlet-port field Wa, when a toner is a color, poor coloring by the lack of temperature can be lost, and a high-definition color picture can be offered.
[0116] Here, the result compared by experiment about the existence [ anchorage device / the anchorage device of the heat tracing method in the gestalt of this operation and / of the former to a certain internal heating method ] of generating of offset and warm-up time is shown in the following table 1.
[0117]
[Table 1]
プロセス速度：１５０mm／秒

| | 定着ローラ表面温度（℃） | | 温度降下（℃） | 定着性 | オフセット発生有無 | ウォームアップ時間（秒） |
|---|---|---|---|---|---|---|
| | 定着ニップ入口 | 定着ニップ出口 | | | | |
| 内部加熱 | １８０ | １６３ | １７ | ○ | × | １５０ |
| 外部加熱 | １４０ | ９０ | ５０ | ○ | ○ | ６０ |

１）定着性は折り曲げ試験方法により判定。
２）オフセットは発生無を○、発生有を×とした。

[0118] By the internal heating method, it is 163 degrees C more than the melting point (105 degrees C) whose fixing roller skin temperature of a fixing nip section outlet is the softening temperature of a toner from Table 1, and offset has occurred. On the other hand, by the heat tracing method, according to a self-cooling operation, the fixing roller skin temperature of a fixing nip section outlet is 90 degrees C below the melting point (105 degrees C) which is the softening temperature of a toner, and offset is not generated. Furthermore, by the heat tracing method, it turns out that warm-up time is also sharply shortened compared with an internal heating method.
[0119] Moreover, the difference of inlet temperature and outlet temperature, i.e., the width of face of a temperature reduction, is large. [ in / compared with an internal heating method / in a heat tracing method / the fixing nip section ] Thereby, since it is fully cooled in the fixing nip department, the toner by which melting was carried out can reduce generating of offset.
[0120] Therefore, it turns out that it is required to enlarge width of face of a temperature reduction, securing the softening temperature of a toner, in order to reduce offset certainly. It is possible to consider as the approach of enlarging width of face of this temperature reduction, and to heighten the heat dissipation effectiveness in the fixing nip section.
[0121] What is necessary is just to form minute with a diameter of 0.2-0.3mm air hole 52e-- in pressurization belt 52a, in order to heighten the heat dissipation effectiveness of the above-mentioned fixing nip section, for example, as shown in drawing 5 .
[0122] Thus, by much air hole 52e-- being formed in pressurization belt 52a, the elevated-temperature air which stagnates to the fixing nip outlet field Wb is positively emitted to the pressurization belt 52a exterior, a convective heat transfer coefficient can be enlarged, improvement stabilization of the heat dissipation engine performance of pressurization belt 52a can be carried out, and the cooling effect of Toner T can be heightened.
[0123] Thereby, since the heat dissipation effectiveness in the heat dissipation field of the pressure-welding section can be heightened, cooling solidification of the toner T by which melting was carried out in the fixing nip inlet-port field Wa can be certainly carried out in this fixing nip outlet field Wb. Consequently, since Toner T can be completely fixed to Form P, offset can be abolished certainly.
[0124] However, although the cooling effect of pressurization belt 52a will increase if the above-mentioned air-hole 52e raises the rate of the area of the whole air hole per unit area, it is necessary to form in extent which does not spoil welding pressure required for fixing.

[0125] In the anchorage device 50 of the above-mentioned configuration from the above thing The fixing roller 51 by which the temperature control was carried out to predetermined temperature in the fixing nip inlet-port field Wa, From metal 1st pressurization roller 52b and 3rd pressurization roller 52d which carried out accumulation, the heat energy which flows in from a fixing roller 51 Heat energy flows into Form P positively, and the toner T on this form P is softening temperature TN. The above temperature T0 It will be in sufficient elevated-temperature melting condition to reach and color. The toner which carries out elevated-temperature fusion like a color toner by this, and colors can also be made to fully correspond.
[0126] On the other hand, the toner T by which the temperature up was carried out in the above-mentioned fixing nip inlet-port field Wa more than softening temperature radiates heat through metal pressurization belt 52a, and will be in a low-temperature condition from softening temperature in the fixing nip outlet field Wb, and cooling solidification will be carried out. Since the cohesive force of the toner at the time of this cooling solidification becomes very large, the adhesion force to a fixing roller 51 will decline, and it will be completely fixed to Toner T on Form P.
[0127] And since the oil for offset prevention is not needed, consequently a complicated oil spreading device becomes unnecessary like before, low cost-ization of equipment is realizable. Moreover, since it is not necessary to operate it to a fixing roller 51 for offset prevention, such as oil spreading, the life of a fixing roller 51 can be prolonged.
[0128] it mentioned above -- as -- the fixing nip inlet-port field Wa -- setting -- pressurization belt 52a -- thermal conductivity -- excelling -- a metal belt with the high heat dissipation cooling effect with small heat capacity -- constituting -- the 1st and the 3rd -- with constituting pressurization roller 52 b.52d from a metal roller with the high accumulation effectiveness, it is stabilized to the toner T of the form P conveyed to the fixing nip inlet-port field Wa, and heat energy can be supplied. Therefore, the temperature change of the fixing nip inlet-port field Wa becomes the stable thing.
[0129] [Gestalt 2 of operation] The gestalt of other operations of this invention is explained below. In addition, for convenience, the same notation is given to the member of explanation which has the same function as the gestalt 1 of said operation, and the explanation is omitted to it.
[0130] As the anchorage device concerning the gestalt of this operation is shown in drawing 6 , silicone rubber foam and enveloping layer 51c consists of [ core material 51a of a fixing roller 51 ] PFA(s) for an aluminum roller in the air and thermal break 51b.
[0131] Thus, by making the core of a fixing roller 51 into a cavity, fixing roller 51 self is made easy to cool, and the cooling effect of the toner T in the fixing nip outlet field Wb is heightened.
[0132] Furthermore, a fan is stationed inside the above-mentioned core material 51a, and you may make it cool compulsorily the fixing nip outlet field Wb of a fixing roller 51 inside as a means to make a fixing roller 51 cool, for example.
[0133] Moreover, a heat pipe may be used instead of the above-mentioned fan. In this case, although not illustrated, he arranges a heat pipe crosswise [ of core material 51a ], and is trying to miss outside the heat accumulated in the fixing roller 51 interior through the above-mentioned heat pipe.
[0134] As mentioned above, according to the anchorage device of the above-mentioned configuration, the heat dissipation effectiveness of the fixing nip outlet field Wb can be heightened by establishing each means for cooling compulsorily the fixing roller 51 for giving heat energy to a toner. At this time, energization of the heating roller 54 of a heating roller 53 is controlled for the accumulation effectiveness in the fixing nip inlet-port field Wa not to fall.
[0135] Therefore, since the anchorage device of the above-mentioned configuration is the configuration that the heat dissipation effectiveness of the fixing nip outlet field Wb was heightened, it can make cooling solidification of Toner T ensure in the fixing nip outlet field Wb. Since prevention of offset can be aimed at and poor fixing of a toner can be reduced by this, a high-definition image can be formed.
[0136] In the gestalt 2 of the above-mentioned implementation, in order to heighten the heat dissipation effectiveness of the fixing nip outlet field Wb, it is considering as the configuration which heightens the cooling effect of a fixing roller 51. However, in order to heighten the heat dissipation effectiveness of the fixing nip outlet field Wb, it is good also as a configuration which heightens the cooling effect of for

example, pressurization device 52 self, and the gestalten 3 and 4 of the following operations explain this.

[0137] [Gestalt 3 of operation] The gestalt of the operation of further others of this invention is explained below. For convenience, the same notation is given to the member of explanation which has the same function as the gestalt 1 of said operation, and the explanation is omitted to it.
[0138] The anchorage device concerning the gestalt of this operation is the configuration that the fan 56 has been stationed as a cooling means in the location corresponding to the fixing nip outlet field Wb inside pressurization belt 52a, as shown in drawing 7 . That is, the above-mentioned anchorage device has composition which heightens the cooling effect of pressurization device 52 self, in order to heighten the heat dissipation effectiveness of the fixing nip outlet field Wb.
[0139] Thus, the heat dissipation property of pressurization belt 52a can be raised by the fan 56 being stationed in the location corresponding to the fixing nip outlet field Wb inside pressurization belt 52a. Consequently, the toner T on the form P conveyed to the fixing nip outlet field Wb can be cooled effectively.
[0140] As a cooling means of the above-mentioned pressurization belt 52a, the following approaches other than the above-mentioned fan 56 can be considered.
[0141] ** How to cool pressurization belt 52a using the low-temperature member cooled with the heat pipe.
[0142] ** How to color black and carry out the radiative cooling of the inside of pressurization belt 52a.
[0143] ** How to prepare an inlet so that an external wind may enter the fixing nip outlet field Wb of pressurization belt 52a.
[0144] Here, it explains below, referring to drawing 8 about the case of ** among the approaches of the above-mentioned ** thru/or **. In addition, drawing 8 (a) shows the outline top view which looked at the anchorage device shown in drawing 7 from the upper part side.
[0145] ** The low-temperature member used consists of abbreviation tabular SUS61 and a heat pipe 62 prepared in this SUS61 by penetrating, as shown in drawing 8 (b).
[0146] The above SUS 61 is installed in the location corresponding to the fixing nip outlet field Wb inside pressurization belt 52a crosswise [ of this pressurization belt 52a ], as shown in drawing 8 (a). This SUS61 is formed for a long time than the width of face of this pressurization belt 52a so that the end section may project from the cross direction of the above-mentioned pressurization belt 52a.
[0147] Moreover, SUS61 is approached and formed in pressurization belt 52a, and heat energy flows in from this pressurization belt 52a. And heat energy is transmitted through the heat pipe 62 inside SUS61.
[0148] The fan 63 for cooling SUS61 projected from pressurization belt 52a is formed in the above-mentioned anchorage device. By this fan 63, by spraying a wind on a part for the lobe of SUS61, a heat pipe 62 can be cooled and the SUS61 whole can be cooled.
[0149] Thereby, since pressurization belt 52a can be cooled effectively in the location corresponding to the fixing nip outlet field Wb, the offset by the poor temperature fall of the fixing nip outlet field Wb can be prevented.
[0150] [Gestalt 4 of operation] The gestalt of the operation of further others of this invention is explained below based on drawing 9 thru/or drawing 11 . In addition, for convenience, the same notation is given to the member of explanation which has the same function as the gestalt of each aforementioned operation, and the explanation is omitted to it.
[0151] As the anchorage device concerning the gestalt of this operation is shown in drawing 9 , the fan 56 is formed in the location corresponding to the fixing nip outlet field Wb inside pressurization belt 52a like the anchorage device given in the gestalt 3 of the aforementioned operation. Furthermore, the sensor 57 by which this pressurization belt 52a detects the temperature of pressurization belt 52a in a fixing roller 51 and the latest (near fixing nip outlet field Wb) to leave is formed in the interior of pressurization belt 52a, and rotation of the above-mentioned fan 56, i.e., refrigeration capacity, is controlled based on the detection signal from this sensor 57.
[0152] It connects with a control circuit 17 and, specifically, the above-mentioned control circuit 17 controls rotation of a fan 56 based on the detection signal of the above-mentioned sensor 57 so that the

above-mentioned sensor 57 and a fan 56 show drawing 10 .
[0153] Here, it explains below, referring to the flow chart shown in drawing 11 about the above-mentioned fan's 56 roll control.
[0154] First, if the power source of a laser beam printer is turned on and warming up, such as an anchorage device, is performed, a control circuit 17 will set a fan's 56 rotational frequency as M, and will carry out the rotation drive of the fan 56 at this rotational frequency M (S1). At this time, it is the temperature T1 of pressurization belt 52a near the fixing nip outlet field Wb. It detects.
[0155] Subsequently, the above-mentioned temperature T1 It judges whether it is more than predetermined temperature Talpha (S2). Here, it is temperature T1. If it is more than predetermined temperature Talpha, it is the temperature T1 of pressurization belt 52a near the fixing nip outlet field Wb. It is judged with going up to the value near the offset generating critical temperature of a toner, a fan's 56 rotational frequency is set as M+alpha only with many counts alpha of predetermined from M (S3), and the rotation drive of the fan 56 is carried out by this rotational frequency M+alpha.
[0156] Next, the above-mentioned temperature T1 It judges whether it is below predetermined temperature Tbeta (S4). Here, it is temperature T1. If it is below predetermined temperature Tbeta, it is the temperature T1 of pressurization belt 52a near the fixing nip outlet field Wb. It is judged with having fallen beyond the need, a fan's 56 rotational frequency is again set as M from M+alpha (S5), and the rotation drive of the fan 56 is carried out at this rotational frequency M.
[0157] As mentioned above, it is the temperature T1 of pressurization belt 52a near the fixing nip outlet field Wb about a fan's 56 engine speed. By making it respond and change, the temperature of the fixing nip outlet field Wb can be kept constant.
[0158] Generally, a toner colors by melting being carried out. For this reason, it is necessary to fully carry out melting of the toner in the fixing nip inlet-port field Wa. Moreover, in order to fix a toner to a form, it is necessary to fully cool a toner and to enlarge the cohesive force.
[0159] Therefore, if the temperature of the fixing nip outlet field Wb becomes high too much, without the ability solidifying a toner, it will cease to be completely fixed to a form and offset will occur. On the other hand, when the temperature of the fixing nip outlet field Wb becomes low too much, there is a possibility that the temperature of the fixing nip inlet-port field Wa may also fall. In this case, since it comes to move to the fixing nip outlet field Wb while a form has not fully fused a toner in the fixing nip inlet-port field Wa, the problem of the ability not to make a toner fully coloring arises.
[0160] From these things, the accumulation effectiveness in the fixing nip inlet-port field Wa and the heat dissipation effectiveness in the fixing nip outlet field Wb can always be kept constant by keeping constant the temperature of the fixing nip outlet field Wb as mentioned above. Therefore, a high-definition image can always be obtained.
[0161] Furthermore, what is necessary is just to heighten the cooling effect of a fixing roller 51, while heightening the cooling effect of pressurization belt 52a, in order to heighten the cooling effect of Toner T. For this reason, what is necessary is to form a fan 56 in the interior of pressurization belt 52a, and also for core material 51a of a fixing roller 51 just to consist of aluminum rollers in the air like the gestalt 2 of said operation as mentioned above.
[0162] As mentioned above, with the gestalt of each above-mentioned implementation, since the fixing nip section is formed with the pressure welding of pressurization belt 52a and a fixing roller 51, width of face of this fixing nip section can be made larger than the width of face of the fixing nip section mutually formed with rollers. Thereby, since melting of a toner and cooling solidification can fully be performed in the fixing nip department, even if Form P passes the fixing nip section at a high speed, fixing which does not have offset and was stabilized can be performed. Therefore, it can respond also to a high-speed print.
[0163] And since the heat tracing method which heats the front face of a fixing roller 51 from the exterior is used for the anchorage device of this application, it can shorten sharply a heating up time until the fixing nip section becomes predetermined temperature.
[0164] Moreover, by the heat tracing method, since it is heated compared with the anchorage device of an internal heating method by heat capacity required to be fixed to fixing roller 51 front face from the

exterior, it excels in thermal efficiency and warm-up time can be shortened. Furthermore, since the boundary of thermal break 51b and core material 51a which consist of rubber can be stopped low, it is hard coming to generate exfoliation of thermal break 51b, and the life of a fixing roller 51 can be raised sharply.

[0165]

[Effect of the Invention] The fixing roller with which, as for the anchorage device of invention of claim 1, the front face was heated from the exterior as mentioned above, It is laid with this fixing roller and two or more pressurization rollers arranged at parallel. Including the pressurization belt which presses the peripheral face of this fixing roller in the pressure-welding section formed by the above-mentioned fixing roller and the pressurization belt In the anchorage device which thermofusion of the toner is carried out [ anchorage device ] to this record material, and fixes it to it by conveying the record material in which the non-established toner image was formed in the above-mentioned pressure-welding section It is the configuration that the accumulation field set as the temperature more than the softening temperature of a toner and the heat dissipation field set as temperature required in order to carry out cooling solidification of the toner by which melting was carried out are formed in order from the conveyance direction upstream of record material.

[0166] So, since it is not necessary to apply the oil for offset prevention to a fixing roller for the offset prevention after fixing, the various problems resulting from the oil for offset prevention are solvable. Since the device which applies the oil for offset prevention especially is not needed, equipment can be simplified and the effectiveness that image formation equipments, such as a printer equipped with this anchorage device, can be offered cheaply is done so.

[0167] The anchorage device of invention of claim 2 is the configuration that contact arrangement of at least one pressurization roller is carried out through the above-mentioned pressurization belt among two or more pressurization rollers at the fixing roller in the above-mentioned accumulation field while being formed as mentioned above for the material for which a pressurization belt has thermal conductivity in addition to the configuration of claim 1.

[0168] So, since the heat energy from a fixing roller and the heat energy from the above-mentioned pressurization roller flow in, the toner on the record material which the pressurization roller which touches the fixing roller through a pressurization belt becomes easy to be covered with heat in addition to the effectiveness by the configuration of claim 1, and was conveyed in the accumulation field will be in an elevated-temperature melting condition. Thus, in an accumulation field, the effectiveness that heat energy can be efficiently supplied to the toner on record material is done so.

[0169] The pressurization roller with which contact arrangement of the anchorage device of invention of claim 3 is carried out through the pressurization belt as mentioned above at the fixing roller in addition to the configuration of claim 2 is a configuration which consists of accumulation material.

[0170] So, since the pressurization roller by which contact arrangement is carried out through the pressurization belt at the fixing roller in addition to the effectiveness by the configuration of claim 2 can carry out accumulation of the heat energy which flows in from a fixing roller, in the accumulation field of the fixing section, little heat energy can maintain it at an elevated-temperature condition. Since there is little energy required in order to heat a fixing roller and it ends by this, the effectiveness that an economical anchorage device can be offered is done so.

[0171] The pressurization roller with which the anchorage device of invention of claim 4 exists in a heat dissipation field as mentioned above in addition to the configuration of claims 2 or 3 is a configuration which consists of a heat insulator.

[0172] So, since the heat energy which flows in from a pressurization belt in a heat dissipation field is not accumulated in a pressurization roller in addition to the effectiveness by the configuration of claims 2 or 3, the effectiveness that cooling solidification of the melting toner on record material can be carried out effectively is done.

[0173] The anchorage device of claim 5 is a configuration set up after accumulation of the pressurization roller with which the conveyance timing of the record material to the pressure-welding section consists of the above-mentioned accumulation material is carried out by the heat from the above-mentioned

fixing roller as mentioned above in addition to a configuration according to claim 3 or 4.
[0174] So, since it can consider as the condition of fully having been heated before record material is conveyed by the pressure-welding section in addition to the effectiveness by the configuration according to claim 3 or 4, melting of the non-established toner on record material can be certainly carried out from a pressure-welding section inlet-port field. Thereby, when a toner is a color, poor coloring by the lack of temperature can be lost, and the effectiveness that a high-definition color picture can be offered is done so.
[0175] The anchorage device of invention of claim 6 is the configuration that the heating roller which heats the front face of a fixing roller from the outside to the record material conveyance direction upstream of the pressure-welding section is formed as mentioned above in addition to claim 1 thru/or which configuration of 5.
[0176] So, since a fixing roller comes to be heated from the record material conveyance direction upstream of the pressure-welding section by the heating roller in addition to claim 1 thru/or the effectiveness by which configuration of 5, loss of the heat between a heating roller and the pressure-welding section can be reduced. This does so the effectiveness that the energy which starts an anchorage device in a toner since a fixing roller can be heated to temperature required for melting is reducible, with little energy.
[0177] The anchorage device of invention of claim 7 is the configuration that many air holes are formed in addition to claim 1 thru/or which configuration of 6, as for the pressurization belt, as mentioned above.
[0178] So, in addition to claim 1 thru/or the effectiveness by which configuration of 6, the elevated-temperature air which stagnates to the heat dissipation field of the pressure-welding section is positively emitted to the belt exterior, a convective heat transfer coefficient can be enlarged, improvement stabilization of the heat dissipation engine performance of a pressurization belt can be carried out, and the cooling effect of a toner can be heightened. Thereby, since the heat dissipation effectiveness in the heat dissipation field of the pressure-welding section can be heightened, cooling solidification of the toner by which melting was carried out in the accumulation field can be certainly carried out in this heat dissipation field. Consequently, since a toner can be completely fixed to record material, the effectiveness that offset can be abolished certainly is done so.
[0179] The anchorage device of invention of claim 8 is the configuration that a pressurization belt consists of a metal in addition to claim 1 thru/or which configuration of 7, as mentioned above.
[0180] So, in addition to claim 1 thru/or the effectiveness by which configuration of 7, it can be efficient and the heat energy from the fixing roller in an accumulation field can be transmitted to the pressurization roller by which contact arrangement is carried out through the pressurization belt at this fixing roller. Moreover, the heat energy from the fixing roller in a heat dissipation field can be efficiently emitted to the pressurization belt exterior. Therefore, in the pressure-welding section between a fixing roller and a pressurization belt, since the temperature change stabilized in the toner can be given, the effectiveness without offset that it can be established by being stabilized is done so.
[0181] A fixing roller is the configuration that the core of the anchorage device of invention of claim 9 is cavernous structure as mentioned above in addition to claim 1 thru/or which configuration of 8.
[0182] So, by making the core of a fixing roller into a cavity in addition to claim 1 thru/or the effectiveness by which configuration of 8, since the heat energy from a fixing roller front face is not accumulated in the interior, the effect of the heat dissipation field on the pressure-welding section by the accumulation inside a fixing roller can be lost. This does so the effectiveness that the cooling effect of the toner in the heat dissipation field of the pressure-welding section can be heightened.
[0183] The anchorage device of invention of claim 10 is the configuration that a cooling means to cool near the record material outlet of the pressure-welding section with the fixing roller of a pressurization belt is established as mentioned above in addition to claim 1 thru/or which configuration of 9.
[0184] So, a pressurization belt can be compulsorily cooled by a cooling means to cool near the record material outlet of the pressure-welding section of a pressurization belt being established in addition to claim 1 thru/or the effectiveness by which configuration of 9. By this, the convective heat transfer

coefficient of a pressurization belt is enlarged, improvement stabilization of the heat dissipation engine performance of a pressurization belt is carried out, and the effectiveness that the cooling effect of the toner in a heat dissipation field can be heightened is done so.

[0185] The anchorage device of invention of claim 11 is a configuration prepared in the field to which the cooling means was surrounded with the pressurization belt and the pressurization roller in addition to the configuration of claim 10 as mentioned above.

[0186] So, since the elevated-temperature air which stagnates to the field surrounded with the pressurization belt and the pressurization roller by the cooling means can be made to discharge compulsorily in addition to the effectiveness by the configuration of claim 10, the effectiveness that the cooling effect of a pressurization belt can be heightened further is done.

[0187] The anchorage device of claim 12 is the configuration that a temperature detection means to detect the temperature of the pressurization belt near the record material outlet of the pressure-welding section in addition to the configuration of claims 10 or 11, and the cooling control means which controls the refrigeration capacity of a cooling means based on the detection information on the above-mentioned temperature detection means are established as mentioned above.

[0188] So, since the pressurization belt is controlled based on the temperature of the latest pressurization belt with which the refrigeration capacity of a cooling means secedes from a fixing roller in addition to the effectiveness by the configuration of claims 10 or 11, the temperature in the heat dissipation field of the pressure-welding section can be kept constant. This does so the effectiveness that the cooling effect of the toner in the above-mentioned heat dissipation field can be stabilized.

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[Translation done.]

* NOTICES *



## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline block diagram of the anchorage device concerning the gestalt of 1 operation of this invention.
[Drawing 2] It is the outline block diagram of the laser beam printer equipped with the anchorage device shown in drawing 1 .
[Drawing 3] It is the explanatory view showing the flow of the heat energy in the fixing nip section of the anchorage device shown in drawing 1 .
[Drawing 4] It is the graph which shows the temperature distribution of the toner in the fixing nip section of the anchorage device shown in drawing 1 .
[Drawing 5] It is the outline top view showing an example of the pressurization belt with which the anchorage device shown in drawing 1 is equipped.
[Drawing 6] It is the outline block diagram of the anchorage device concerning the gestalt of other operations of this invention.
[Drawing 7] It is the outline block diagram of the anchorage device of this invention further applied to the gestalt of other operations.
[Drawing 8] It is the explanatory view showing an example of the cooling means for cooling the pressurization belt in the anchorage device shown in drawing 7 .
[Drawing 9] It is the outline block diagram of the anchorage device of this invention further applied to the gestalt of other operations.
[Drawing 10] It is the block diagram showing the cooling control in the control circuit with which the anchorage device shown in drawing 9 was equipped.
[Drawing 11] It is the flow chart which shows a cooling control flow in the control circuit shown in drawing 10 .
[Drawing 12] It is the outline block diagram of the conventional anchorage device.
[Drawing 13] It is the outline block diagram of the conventional anchorage device.
[Description of Notations]
17 Control Circuit (Cooling Control Means)
50 Anchorage Device
51 Fixing Roller
51a Core material
52a Pressurization belt
52b The 1st pressurization roller (pressurization roller)
52c The 2nd pressurization roller (pressurization roller)
52d The 3rd pressurization roller (pressurization roller)
52e Air hole
53 Heating Roller
56 Fan (Cooling Means)
57 Sensor (Temperature Detection Means)

P Form (record material)
T Toner
Wa Fixing nip inlet-port field (accumulation field)
Wb Fixing nip outlet field (heat dissipation field)

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[Translation done.]

* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

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DRAWINGS

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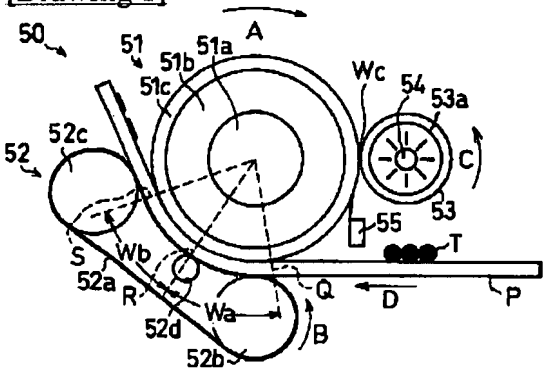
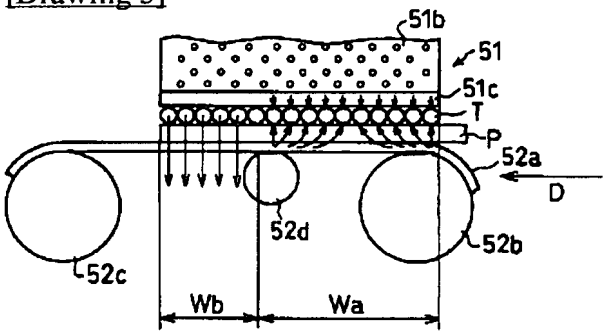
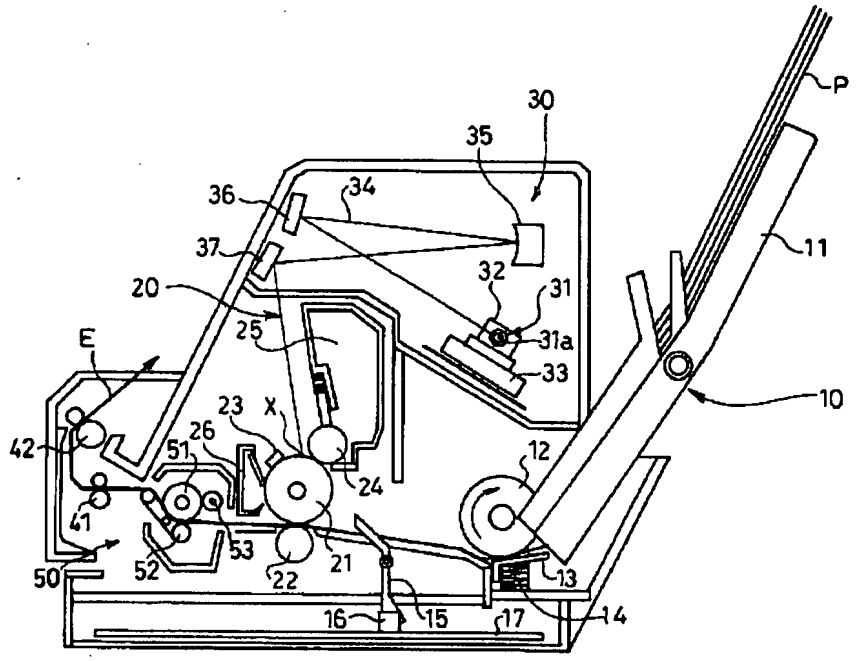
[Drawing 1]




[Drawing 3]




[Drawing 2]

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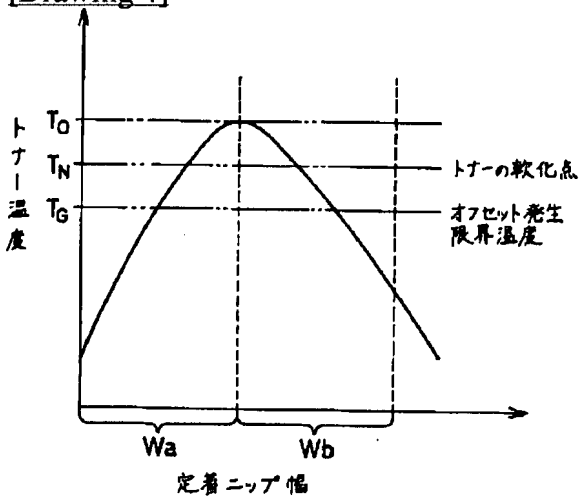
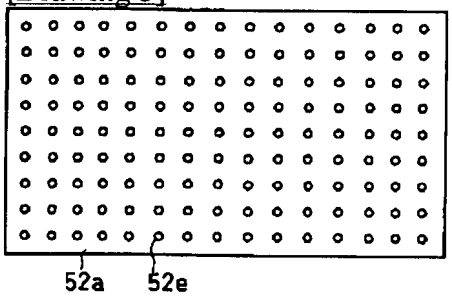



[Drawing 5]

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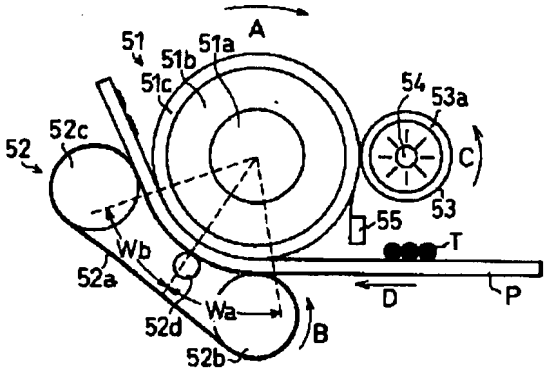


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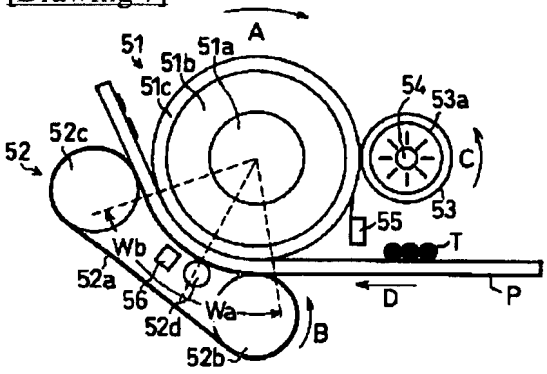
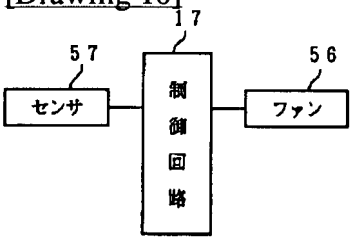
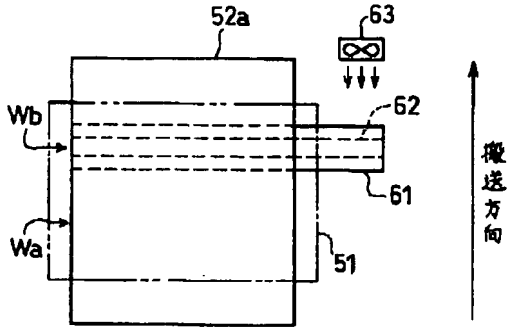



[Drawing 10]




[Drawing 8]

(a)

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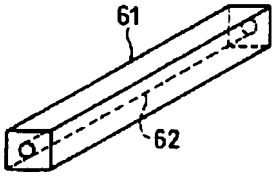
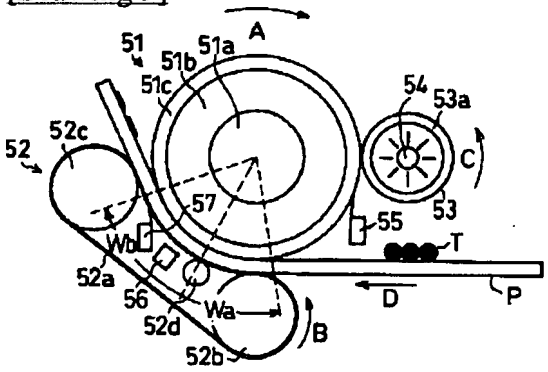
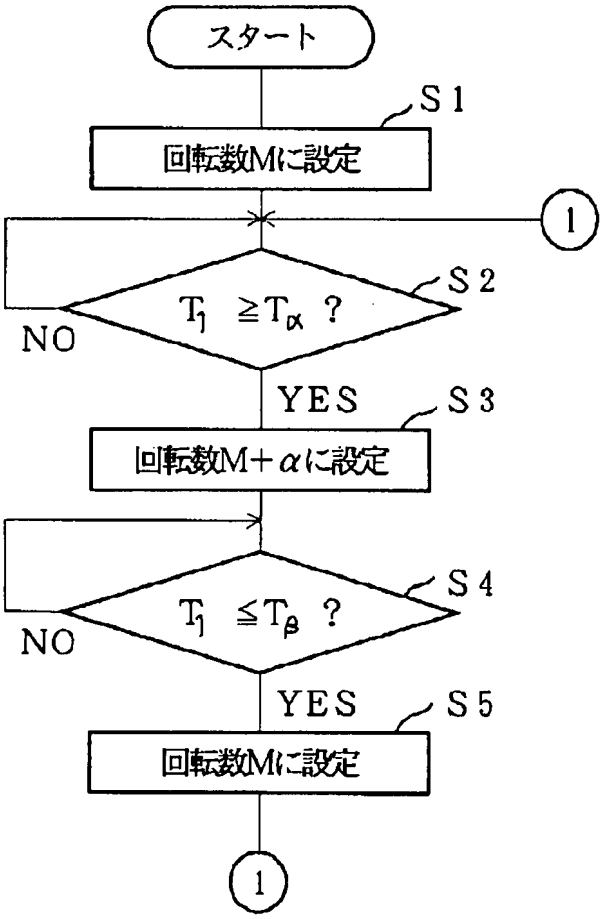


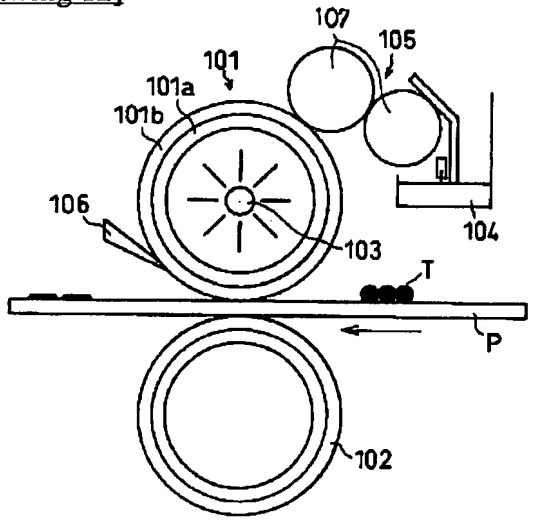

[Drawing 9]



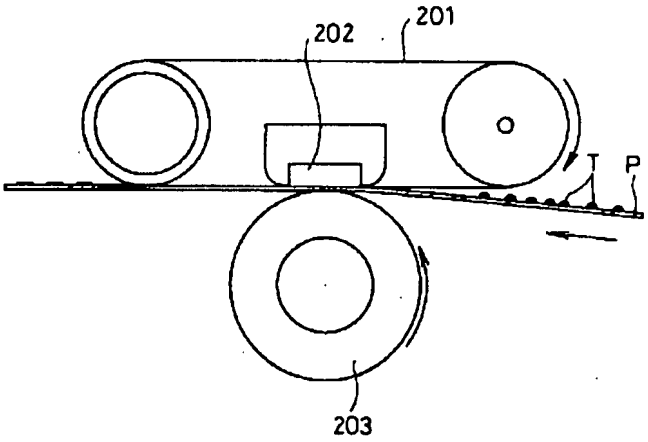

[Drawing 11]




[Drawing 12]




[Drawing 13]




[Translation done.]